

CLAIMS

What is claimed is:

- Fig. 1*
1. An optical device comprising:
- a substrate including a through hole;
- an optical element mounted on the substrate and having an optical section placed to face the through hole; and
- a light transmissive member disposed at the through hole.
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- Fig. 2*
2. An optical device according to claim 1, wherein light transmissive under-fill material is provided between the substrate and the optical element and between the light transmissive member and the optical element.
3. An optical device according to claim 1, wherein a spacer is interposed between the optical element and the light transmissive member.
4. An optical device according to claim 1, wherein the light transmissive member is in a lens shape.
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- Fig. 3*
5. An optical device comprising:
- a substrate including a through hole;
- an optical element mounted on the substrate and having an optical section placed to face the through hole; and
- a lens provided on the substrate and covering the through hole.

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6. An optical device according to claim 5, wherein light transmissive under-fill material is provided between the substrate and the optical element and between the lens and the optical element.

Fig. 4

7. An optical device according to claim 5, wherein a spacer is interposed between the substrate and the lens.

Fig. 5

8. An optical device according to claim 1, wherein an electronic element other than the optical element is mounted on the substrate.

Fig. 6

9. An electronic apparatus comprising the optical device set forth in claim 1.

10. A method for manufacturing an optical device, comprising the steps of:
mounting an optical element on a substrate in which a through hole is formed such that an optical section of the optical element is placed to face the through hole;
providing light transmissive under-fill material between the substrate and the optical element; and
disposing a light transmissive member at the through hole.

11. A method for manufacturing an optical device according to claim 10, further comprising disposing a spacer between the optical element and the light transmissive member.

12. A method for manufacturing an optical device according to claim 10, wherein the light transmissive member is disposed at the through hole after the under-fill material is provided.

13. A method for manufacturing an optical device according to claim 10, wherein the under-fill material is provided after the light transmissive member is disposed at the through hole.

14. A method for manufacturing an optical device according to claim 10, wherein the light transmissive member is disposed at the through hole after the optical element is mounted on the substrate.

15. A method for manufacturing an optical device according to claim 10, wherein the optical element is mounted on the substrate after the light transmissive member is disposed at the through hole.

16. A method for manufacturing an optical device, comprising the steps of:
mounting an optical element on a substrate in which a through hole is formed such that an optical section of the optical element is placed to face the through hole;
providing light transmissive under-fill material between the substrate and the optical element; and
disposing a lens on the substrate to cover the through hole.

17. A method for manufacturing an optical device according to claim 16, further comprising providing a spacer between the substrate and the lens.

18. A method for manufacturing an optical device according to claim 16, wherein the lens is mounted after the under-fill material is provided.

19. A method for manufacturing an optical device according to claim 16, wherein the under-fill material is provided after the lens is mounted.

20. A method for manufacturing an optical device according to claim 16, wherein the lens is mounted on the substrate after the optical element is mounted on the substrate.

21. A method for manufacturing an optical device according to claim 16, wherein the optical element is mounted on the substrate after the lens is mounted on the substrate.

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